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DEVICE FOR THE DETACHABLE SECURING OF TUBULAR BODIES, SUCH AS  
GAS BOTTLES, PIPES, TUBULAR CONTAINERS, AND SIMILAR ITEMS

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**DEVICE FOR THE DETACHABLE SECURING OF TUBULAR BODIES, SUCH AS  
 GAS BOTTLES, PIPES, TUBULAR CONTAINERS, AND SIMILAR ITEMS**

[Vorrichtung zur lösbaren Halterung von rohrförmigen Körpern, wie Gasflaschen,  
 Rohre, rohrförmige Behälter oder dergleichen]

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A request for an examination pursuant to § 44 PatG has been filed //submitted.

The following information has been taken [unedited] from documents submitted by the applicant.

The invention relates to a device for the detachable holding of tubular bodies, such as gas bottles, pipes, tubular containers or similar items, onto or on the loading surfaces of passenger cars, consisting of a board-shaped base body, on which is arranged at least one attachment belt with a closure for the fixed, but detachable, wrapping of the tubular body on its surface, and where the bottom side of the body is provided with an anti-slip coating.

A known device of this type has been disclosed in DE-GM 299 05 168.4. In this prior publication, the embodiment shown in Figures 1-9 presents the advantages described therein; however, it has the drawback that, during braking or while driving on curves, the board-shaped base body, under the inertial force of the secured tubular bodies, can shift together with the latter, which shifting must be prevented under all circumstances in the case of gas bottles. And, finally, the tubular bodies can possibly rotate on the rivets of the belts, or they can be shifted in the longitudinal direction, which is also undesirable.

Starting from this closest state of the art, the problem of the invention is to produce a device of the type mentioned in the introduction that secures by wrapping the board-shaped base body, and also secures against rotation of the tubular body that is held on the base body.

This problem is solved according to the invention, in connection with the concept mentioned in the introduction, by the fact that the board-shaped base body is fixed by means of a securing belt to at least one lateral area, which is oriented diagonally to the travel direction of the passenger car, on the loading surface to secure against shifting, and, on its surface, two wedge surfaces are provided to secure against rotation, which wedge surfaces are inclined towards each other and form a defined supporting area of the tubular body. By means of the securing belt(s), which are looped either through slits, or through eyelets that are attached by molding in or to the lateral areas of the board-shaped base body, a fixation can be achieved by the fact that their free end can be either clamped between the trunk space cover and the abutting carriage part, or, in the case of a truck surface, in a slit between the loading surface and the backward abutting lateral side plate. As a result, the board-shaped base body is prevented from shifting in the travel direction, even after a intense braking process. To prevent a shifting of the board-shaped base body even in the case of a rear-end collision, it is advantageous to fix the base body by its two lateral areas that are oriented diagonally to the travel direction, in each case with a securing belt. It is also possible to provide the base body in more than one of its lateral areas oriented diagonally with respect to the travel direction, namely also in the lateral areas that are oriented parallel to the travel direction, with securing belts, and to attach the latter by their free ends to carriage parts in a detachable manner.

To secure the tubular body on the base body against rotation or shifting, wedge surfaces are used.

According to an advantageous variant of the invention, these wedge surfaces are formed by two wedge pairs that are provided with an anti-slip surface and clamped to projections of the top side of the base body, or screwed with screws onto the top surface, or glued to it. Here the surfaces of the wedge pairs advantageously form an angle between 10° and 30° with the top side of the base body. To have as large as possible a lever arm for securing against rotation and positional change, the wedge pairs are arranged in the vicinity of the longitudinal or lateral areas

of the base body, which are made of rubber or a synthetic rubber and present a surface with a high coefficient of friction.

According to an advantageous variant of the invention, the anti-slip coating on the bottom side of the board-shaped base body is formed from several knobs or suction caps made of rubber or a synthetic rubber and projecting past the bottom side, where the knobs have a circular, elliptic, triangular, rectangular or polygonal circumferential configuration.

Between its wedge pairs, the board-shaped base body advantageously presents slits, through which the attachment belts for the detachable attachment of the tubular bodies are looped from the bottom side, and present a thickness on the bottom side which is smaller than the thickness of the knobs. As a result, diagonal tension is applied to the tubular body between the belts looped around it and the surfaces of the wedge pairs, which advantageously are made of rubber, or a synthetic rubber, with the result that a high friction is achieved, where the prestressing of the belts that are looped around the tubular body is determined by the type of the closure, for example, a hook-and-loop fastener, a clamping closure, or buckle closure. As a result, any shift or rotation of the tubular body on the board-shaped base body is also ruled out, even if the latter is made advantageously of an impact-resistant and bend-resistant plastic, to which the holders for the wedge pairs and the knobs are injection molded.

The drawing represents an embodiment example of the invention. In the drawing:

Figure 1 shows the top view of the device according to the invention with two attachment belts for the tubular body and two securing belts,

Figure 2 shows the bottom view of Figure 1,

Figure 3 shows the side view of Figure 1 in the direction of arrow III,

Figure 4 shows the top view of Figure 1 with the attachment belts and the securing belts removed,

Figure 5 shows the cross-sectional view along the line V/V of Figure 4,

Figure 6 shows the cross-sectional view through a wedge surface along the line VI/VI of Figure 4,

Figure 7 shows the top view of the device of Figure 1 with a gas bottle attached to it,

Figure 8 shows the side view of Figure 7 in the direction of arrow VIII,

Figure 9 shows the front view of Figure 8 in the direction of arrow IX, and

Figure 10 shows the view of the gas bottle of Figure 1 attached to the device according to the invention, inside the trunk space of a passenger car with two securing belts.

The device 1 according to the invention, as shown in Figures 1-3, for the detachable holding of tubular bodies, such as, gas bottles 2, pipes or tubular containers or similar items, onto or on the loading surfaces 3 (see Figure 10) of passenger cars, consists of a board-shaped base body 4, through which two attachment belts 5 are looped through the slits 6, and either – as

represented – provided with a hook-and-loop closure or with a buckle or clamping closure, to achieve a fixed but detachable loop around the tubular body 2.

In addition, the board-shaped base body 4 is fixed at its two lateral areas 7, which are oriented diagonally to the travel direction arrow 8, in each case with a securing belt 9, where the lateral areas thus are oriented in the travel direction arrow 8. These securing belts 9 are either – as represented – looped through slits 10 of the board-shaped base body 4, or they are arranged, for example, as in Figures 1, 2 and 4, in eyelets 11 that are formed by molding, or they both can be arranged on the lateral area 7 oriented diagonally with respect to the travel direction and also on the longitudinal lateral areas 12 oriented in the travel direction, so that it is possible to fix the base body 4 on at least three sides. This is particularly a function of the weight of the tubular body to be held by the board-shaped base body 4, and it is particularly advantageous in the case of heavy gas bottles and the associated risks.

The security belts 9, which can be seen in Figure 1, can be, according to Figure 10, attached with their free ends 9a, on which a buckle 13 is located, either, as can be seen in Figure 10, inside the belt space 14 of a passenger car near the back seat, or they can be clamped with the other security belts between the backward carriage part 15 and the trunk space cover 16. This clamping can, in the arrangement of the device on a truck surface, be secured in a slit between the loading surface and an abutting lateral side plate.

In all cases, the buckle 13 prevents the security belt 9 from sliding through. In Figure 10, the security belt 9, which is located, for example, between the carriage part 15 and the trunk space cover 16, prevents shifting of the board-shaped body 4 in the case of an abrupt braking, while the opposite security belt 9 prevents shifting in the case of a traffic accident, or a rear-end collision. To further fix security belts 9, slits 10 are provided in the eyelets 11 on the longitudinal lateral areas 12.

In addition, the device 1 according to the invention presents, on the top side 4a of the board-shaped base body 4, in each case, wedge surfaces formed each by two wedge pairs 16, 17, with an anti-slip surface 18, which, in the represented case, are clamped onto the projections 19 (see Figures 4 and 5) of the board-shaped base body 4, or screwed onto the top side 4a, or glued to it.

As can be seen particularly in Figure 3, the upper surface 18 of the wedge pairs 16, 17 forms an angle  $\alpha$  between  $10^\circ$  and  $30^\circ$  with the top side 4a of the base body 4. In the represented case, the angle  $\alpha$  is approximately  $15^\circ$ . The wedge pairs 16, 17 are arranged in the vicinity of the longitudinal lateral areas 12 of the base body 4, and they are made of rubber, or a synthetic rubber, in each case with a surface 18 having a high coefficient of friction.

As a result, the tubular body 2 according to Figures 7-9 can be pressed by means of the attachment belts 5, which can be seen particularly in Figure 1, firmly against the surface 18 of

the wedge pairs 16, 17, in such a way that both a radial rotation in the attachment belt and an axial shift in the direction of the double arrow 20 of Figure 7 are ruled out. In addition, the safety belts 9, which can be looped both in the travel direction along the arrow 8 of Figures 1 and 4 through the slits 10 on the lateral areas 7 and also in the direction of the double arrow 20 of Figure 7 through the slits 10 of the eyelets 11 on the longitudinal lateral areas 12, thus allowing a four-sided fixing of the board-shaped base body 4 on a loading surface, even in the case of a crash or braking, always ensuring a secure holding of the gas bottle 2 or any other tubular body. To increase the stability and holding of the tubular body, the anti-slip coating on the bottom side 4b of the board-shaped base body 4 consists of several knobs 21, made of rubber, or a synthetic rubber, and projecting above the surface of the base body, where, in any case, the knobs have a high coefficient of friction. These knobs are attached according to Figures 4 and 5 to the slit screws 22, which engage through the top side 4a of the base body 4, and which are provided, for this purpose, with a metal sheath 23 which is incorporated by vulcanization, and has an appropriate inner thread.

These knobs 21 can have the represented circular or elliptical, triangular, rectangular or other polygonal circumferential configuration.

It is even possible, on special smooth surfaces, to replace the knobs entirely or partially with suction caps, to produce, in this manner, an even more anti-slip positioning of the base body 4 with the tubular body 2 attached to it.

As one can see in Figure 1, the attachment belts 5 of the bottom side 4b of the board-shaped base body 4 have loops through the slits 6, and they present on this bottom side a thickness which is smaller than the height of the knobs or suction caps 21.

As one can see in Figures 1, 2, 4 and 5, between the slits 6 on the bottom side 4b of the base body 4, duct-shaped backward projections 24 can be formed to guide the attachment belts 5, which can thus be thicker in structure, without reaching the height h of the knobs 21.

The board-shaped base body 4 is manufactured advantageously from an impact resistant and bending resistant plastic such as, for example, a polyamide or a polyurethane, to which holders or projections 19 are attached by injection for the wedge pairs 16, 17, or corresponding projections for the knobs 21.

By means of the above-described device, each tubular body can be pulled tight and clamped by means of the attachment belts 5 with springy elasticity and thus with the possibility of rotation or longitudinal movement, against the surfaces 18 of the wedge pairs 16, 17, which surfaces have a high coefficient of friction, and they can be fixed with the securing belts 9 on a loading surface 3, in such a manner that a shifting of the base body 4 as well as a rotation or longitudinal shifting of the tubular body 2, which is held by it, is prevented during abrupt braking, rear-end collisions, driving on curves or similar processes that generate inertial forces.

The anti-slip coating on the bottom side 4b of the board-shaped base body 4 also contributes to this effect, because it is made either of knobs or of suction caps, or of a mixture of knobs and suction caps, where the bottom side 4b can additionally be fixed to special smooth surfaces, such as, for example, plastic tubs in trunk spaces.

#### Parts list

- 1 Device
- 2 Tubular body
- 3 Loading surface
- 4 Board-shaped base body
- 4a Top side of the base body 4
- 4b Bottom side of the base body 4
- 5 Attachment belts
- 6, 10 Slits
- 7, 12 Lateral areas
- 8 Travel direction arrow
- 9 Securing belt
- 9a End of the securing belt 9
- 11 Eyelets
- 13 Buckle
- 14 Trunk space
- 15 Carriage part
- 16, 17 Wedge pair
- 18 Anti-slip surface of the wedge pair 16, 17
- 19 Protrusions
- 20 Double arrow
- 21 Knobs or suction caps
- 22 Slit screws
- 23 Sheath
- 24 Duct-shaped regressions
- h Height of the knobs or suction caps
- $\alpha$  Angle

#### Claims

1. Device for the detachable securing of tubular bodies, such as gas bottles, pipes, tubular containers or similar items onto or on loading surfaces of passenger cars, consisting of a board-

shaped base body, on which is arranged at least one attachment belt with a closure to wrap firmly, but detachably, the tubular body on its top side, where the bottom side of the tubular body is provided with an anti-slip coating, characterized in that the board-shaped base body (4) is fixed by means of a securing belt (9) to at least one lateral area (7), which is oriented diagonally to the travel direction (arrow 8) of the passenger car, on the loading surface (3) to secure the wrapping and, on its surface (4a), two wedge surfaces (16, 17) are attached to prevent shifting, which wedge surfaces are inclined towards each other and form a defined supporting area (18) of the tubular body (2).

2. Device according to Claim 1, characterized in that the securing belt (9) can be fixed on the backward end (15) of the loading surface (3).

3. Device according to Claims 1 and 2, characterized in that the base body (4) is fixed, on its lateral area (7) which are oriented diagonally to the travel direction (arrow 8), in each case with a securing belt (9).

4. Device according to one of Claims 1-3, characterized in that the tubular body (3) is arranged diagonally with respect to the securing belts (9) on the wedge surfaces (16, 17).

5. Device according to one of Claims 1-4, characterized in that the securing belts (9) are looped either through the slits (10) or through the slits that are shaped on the lateral areas (7, 12), or the free lateral areas (7, 19), and their free end (9a) can be clamped either between the trunk space cover (16) or the abutting carriage part (15), or, in the case of a truck surface, in a slit between the loading surface and an abutting lateral side plate.

6. Device according to one of Claims 1-5, characterized in that the wedge surfaces (16, 17) are formed by two wedge pairs which are provided with an anti-slip surface (18), and clamped to projections (19) of the top side (4a) of the base body (4), or screwed with screws to the top side (4a), or glued to it.

7. Device according to one of Claims 1-6, characterized in that the surfaces (18) of the wedge pairs (16, 17) form an angle ( $\alpha$ ) between  $10^\circ$  and  $30^\circ$  with the top side (4a) of the base body (4).

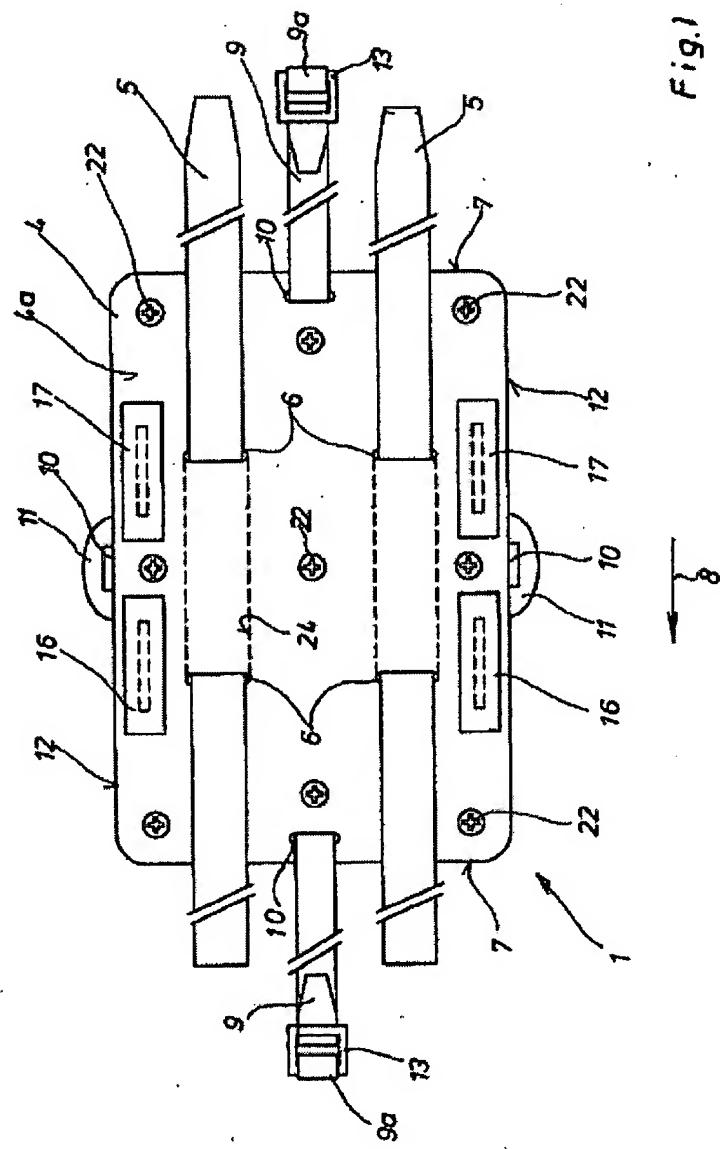
8. Device according to one of Claims 1-7, characterized in that the wedge pairs (16, 17) are arranged in the vicinity of the longitudinal lateral areas (12) of the base body (4), and made of rubber or a synthetic rubber.

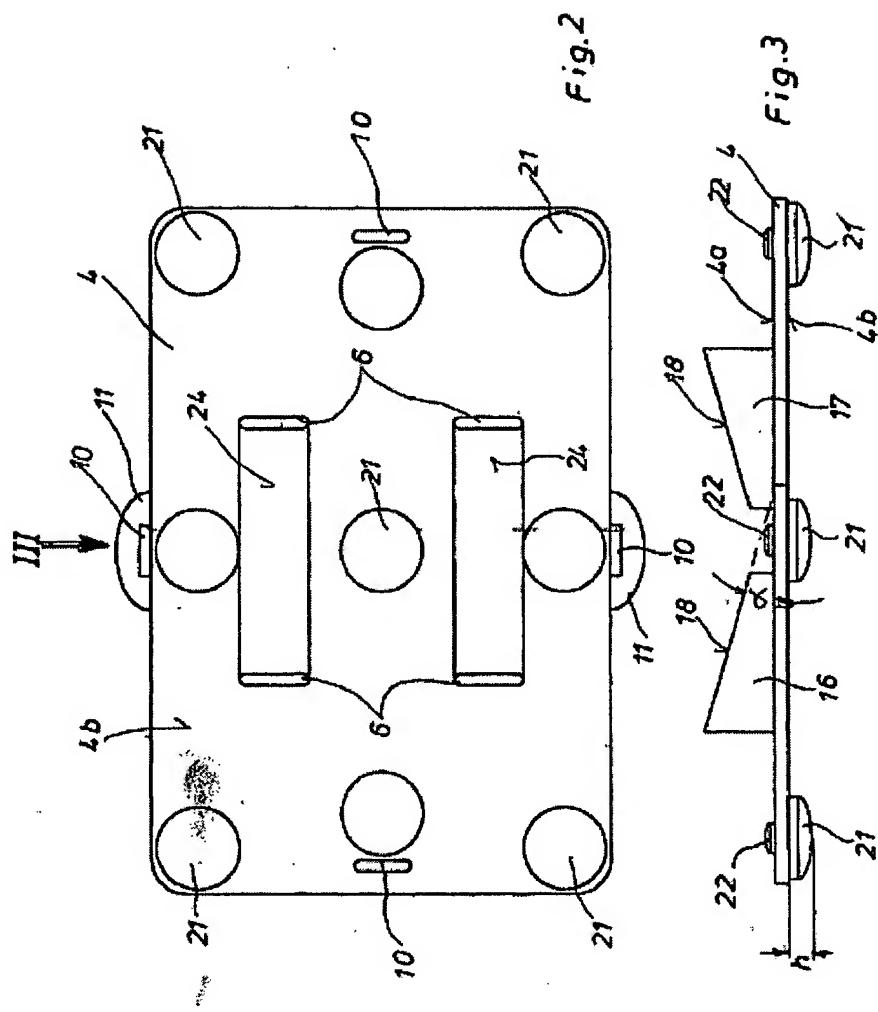
9. Device according to one of Claims 1-8, characterized in that the anti-slip coating on the bottom side (4b) of the board-shaped base body (4) is formed from several knobs (21) or suction caps made of rubber or a synthetic rubber, on the bottom side (4b).

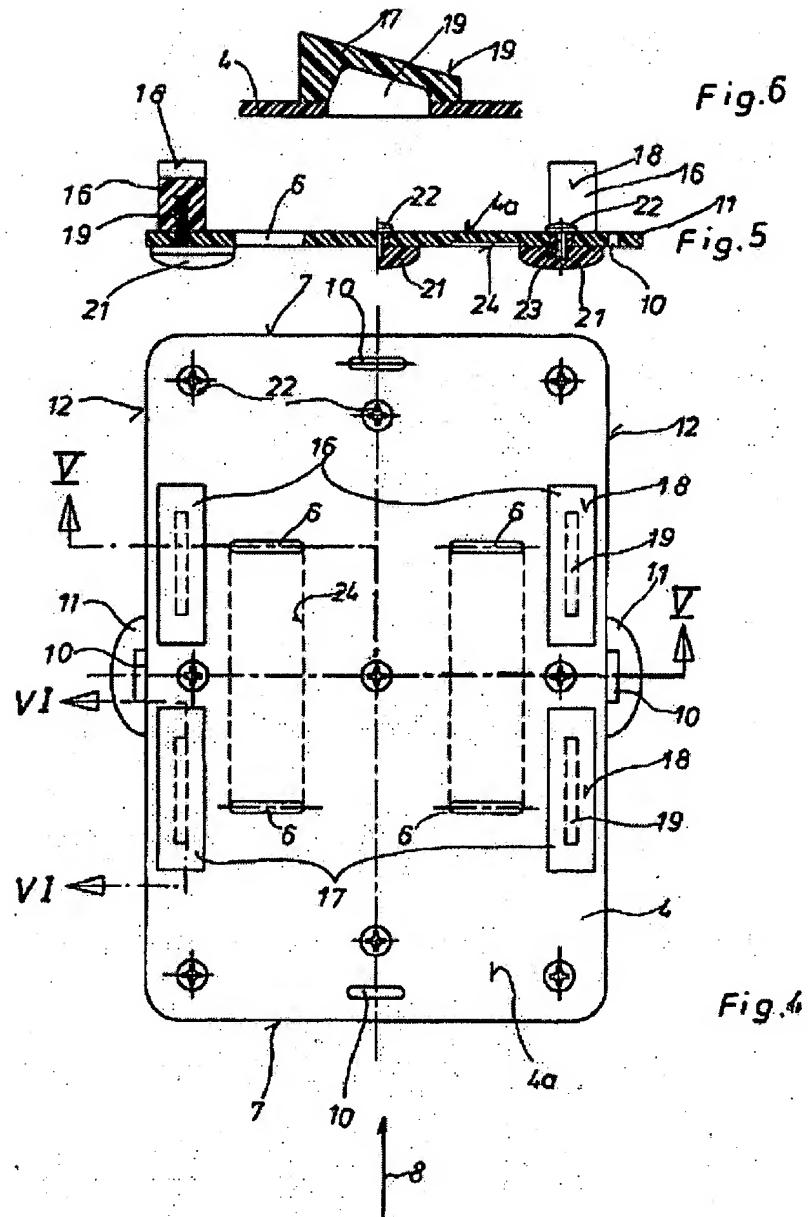
10. Device according to Claim 9, characterized in that the knobs (21) present a circular, elliptic, triangular, rectangular, or polygonal circumferential configuration.

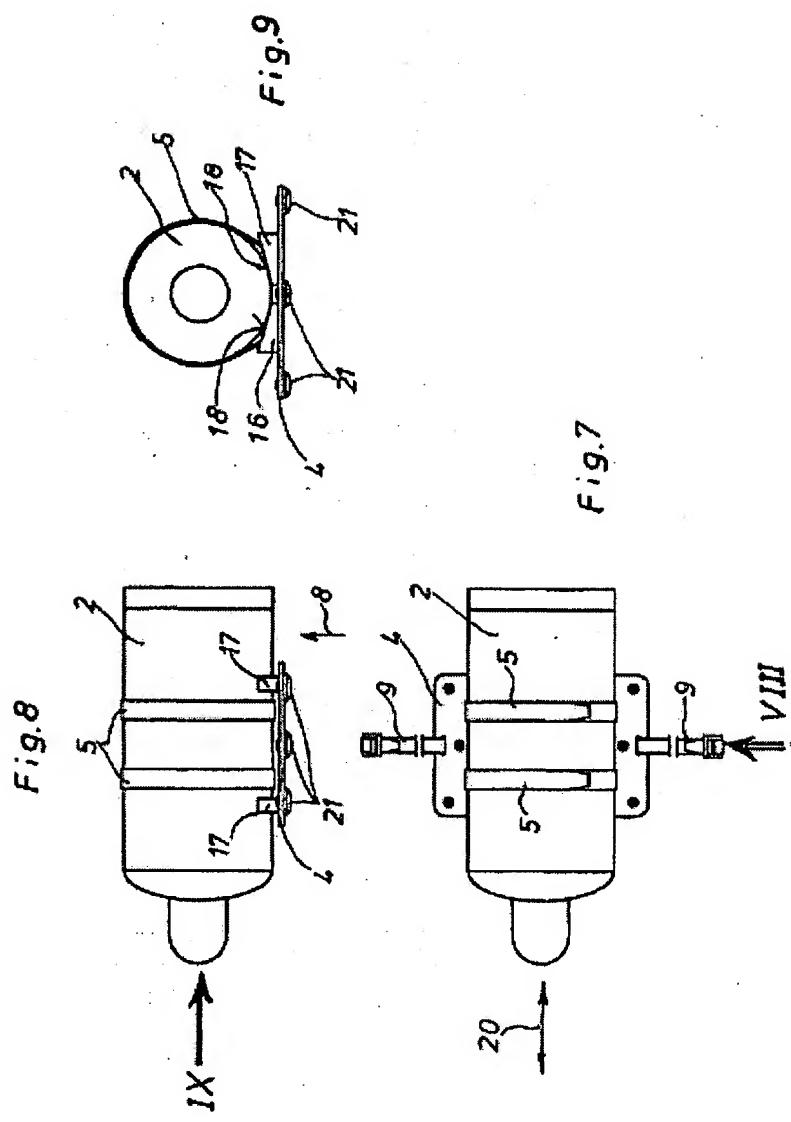
11. Device according to one or more of Claims 1-10, characterized in that the board-shaped base body (4) presents slits (6) between its wedge pairs (16, 17), through which the attachment belts (5) are looped for the detachable attachment of the tubular body (2) from the bottom side (4b); they present, on the bottom side, a thickness which is smaller than the thickness (h) of the knobs (21).

12. Device according to one or more of Claims 1-11, characterized in that the board-shaped base body (4) is made from a impact resistant and bending resistant plastic, to which the holders (19) for the wedge pairs (16, 17) and the knobs (21) are formed by injection molding.









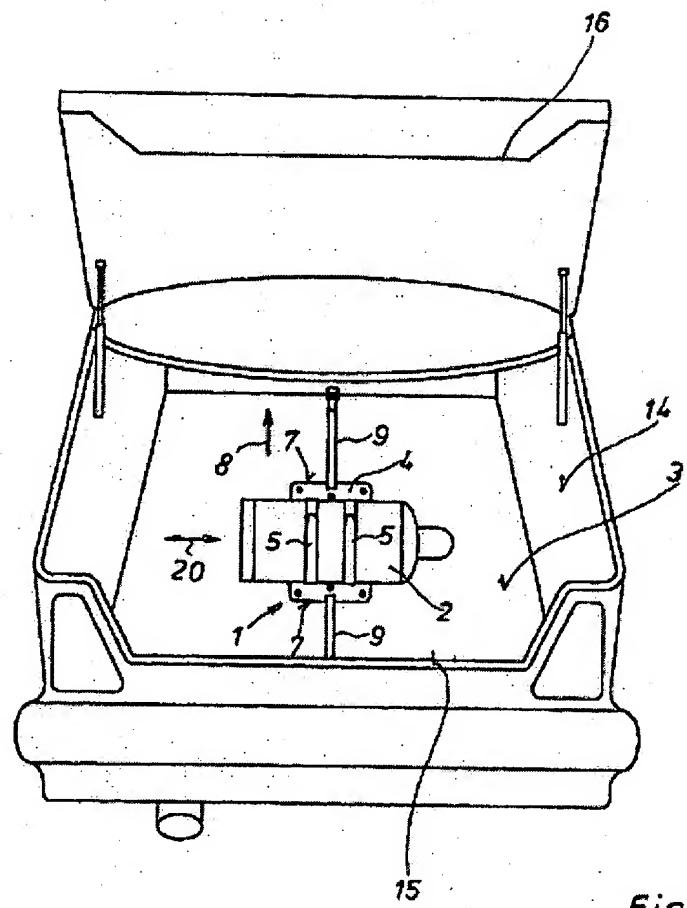


Fig 10